

# Revitalizing Stem Education In Nigeria: A Pathway To Technological Advancement And Economic Growth

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**Abstract:** STEM (Science, Technology, Engineering, and Mathematics) education is fundamental to Nigeria's technological advancement and economic growth. However, the country faces significant challenges, including inadequate infrastructure, outdated curricula, and a shortage of qualified educators. This study explores the importance of STEM education in fostering critical thinking, problem-solving, and innovation. It also examines the current state of STEM education in Nigeria, identifying key challenges such as resource limitations and socioeconomic barriers. By analyzing successful global models, this research highlights potential solutions, including curriculum reforms, increased investment in teacher training, and improved educational technology. Strengthening STEM education will empower Nigeria's workforce, enhance global competitiveness, and drive sustainable development in the Fourth Industrial Revolution era.

**Keywords:** STEM, advancement, national development.

## Introduction

The potential for technological innovation and economic development in Nigeria is dependent on solid foundations in Science, Technology, Engineering, and Mathematics (STEM) education. The World Bank asserts that nations emphasizing STEM education achieve accelerated economic growth and industrial advancement. Nigeria continues to deal with issues like insufficient infrastructure, outdated curricula, and a deficiency of qualified educators in STEM disciplines. STEM constitutes the foundation of technical progress, propelling advancements across sectors including industry, agriculture, healthcare, and digital technology. An advanced STEM education system promotes an effective workforce and bolsters national competitiveness in the global market. Abdulraheem-Mustapha (2021) highlights the essential function of legal frameworks in promoting STEM education in Nigeria, especially within the framework of the Fourth Industrial Revolution (4IR). The report emphasizes the imperative for Nigeria's legal framework to conform to the ideas of the Fourth Industrial Revolution to optimize the advantages of STEM education. Existing legislation, established before to the emergence of the Fourth Industrial Revolution, is considered insufficient and outdated, underscoring the necessity for new legal frameworks that adequately address the requirements of our contemporary epoch. This encompasses offering legal safeguards for beneficiaries of STEM education and guaranteeing gender parity in STEM disciplines.

As the global economy progressively shifts to a knowledge-based approach, the demand for STEM proficiency is growing, necessitating Nigeria to rejuvenate its STEM education framework (Olutayo & Adebayo, 2021).. Through investment in innovative educational resources, teacher training, and industrial partnerships, Nigeria can unleash the full potential of its youth, enabling sustainable economic development and technological empowerment (Adewumin et al., 2024).

According to National Science Teaching Association (NSTA) in Abiodun et al. (2023), STEM education should do the following:

- empower students to be: analytical and critical thinkers;
- enhance their literacy in science, mathematics, and technology.
- cultivate the next generation of innovators and entrepreneurs;
- provide opportunities for engagement in 21st-century skills such as teamwork, collaboration, problem-solving, communication, and creative thinking.
- offer learning experiences where students apply their knowledge in relevant and meaningful contexts.

In Nigeria, STEM education is vital for national development; nevertheless, its present condition is insufficient to satisfy the requirements of technological progress and economic expansion. Notwithstanding the growing global focus on STEM fields as catalysts for innovation and industrial advancement, Nigeria continues to encounter significant obstacles in the proper execution of STEM education (Ogunleye, 2019). The challenges include inadequate infrastructure, obsolete curricula, insufficient money, and a deficiency of qualified STEM educators (Adewumin et al., 2024). Numerous educational institutions are deficient in modern laboratories, digital resources, and experiential learning opportunities, hindering students' ability to acquire essential skills for technical and scientific progress (Olutayo & Adebayo, 2021). Moreover, Social and economic challenges like poverty, gender inequality, and regional differences make it harder for students, especially those in rural areas, to study STEM subjects. (ABUH & AUDU, 2024). To facilitate the shift to a technology-driven economy, it is imperative to revitalize STEM education. This can be accomplished by curricular revisions that integrate emerging technologies, augmented investment in teacher training and professional development, and the use of innovative pedagogical methods to improve student engagement (Akudugu & Abagale, 2024). Nonetheless, despite initiatives to enhance STEM education, a significant study gap persists regarding the viewpoints of educators and learners on its execution. A comprehensive understanding of their experiences, attitudes, and challenges is essential to formulate targeted interventions that will reconcile STEM education policies with classroom realities, thereby enabling Nigeria to fully leverage the potential of STEM for national development (Olutayo & Adebayo, 2021).

This research aims to examine and comprehend the opinions of instructors and students regarding the importance of STEM education in Nigeria, specifically its capacity to foster technical advancement and economic prosperity. In several developing countries, such as Nigeria, STEM education is progressively acknowledged as essential for providing students with the competencies required for the contemporary labour market and promoting innovation-driven economic advancement (Ejiwale, 2013). The efficacy of STEM education mostly hinges on the perspectives, experiences, and readiness of both educators and

learners. Pedagogical strategies employed by educators, the availability of resources, and institutional backing affect the instruction of STEM disciplines, whereas students' engagement, motivation, and access to experiential learning opportunities dictate their proficiency in acquiring essential problem-solving and technical skills (Aina, 2022).

A comprehensive grasp of different viewpoints can aid in formulating successful policies and actions to enhance STEM education. Recognizing these viewpoints is crucial for overcoming obstacles to the effective implementation of STEM education, including inadequate infrastructure, insufficient teacher training, and misalignment between curricula and industry requirements (Ogunleye, 2019). This study is organized around multiple primary objectives:

1. Emphasizing the significance of STEM education in providing students with essential critical thinking and problem-solving abilities required for creativity.
2. Evaluating the present condition of STEM education in Nigeria to discern deficiencies and prospects.
3. Analyzing the primary obstacles encountered in the implementation of STEM education, such as resource restrictions and pedagogical constraints.
4. Investigating potential solutions and strategies for rejuvenating STEM education, including educator training initiatives, curriculum enhancements, and augmented investment in educational technology.
5. Examining case studies of effective STEM education approaches from other nations or regions that Nigeria can emulate.
6. Assessing the prospective influence of improved STEM education on technological progress and economic development.

This study aims to provide a thorough knowledge of how STEM education can serve as a revolutionary instrument for national development. Countries that have effectively invested in STEM education, such as South Korea and Singapore, have experienced substantial progress in technology and industrialization, resulting in economic prosperity (Marginson et al., 2013). If Nigeria implements a comparable strategy—enhancing its STEM education framework via targeted policies and investments—it may cultivate a proficient workforce capable of fostering innovation across diverse industries, including renewable energy and information technology. This research will yield significant recommendations for policymakers, educators, and stakeholders aiming to leverage STEM education as a driver of technical advancement and sustainable economic growth in Nigeria.

### **Significance of STEM Education**

The significance of STEM (Science, Technology, Engineering, and Mathematics) education is paramount, particularly in today's world, where technical progress propels economic expansion and societal progression. STEM education provides students with vital critical thinking, problem-solving, and analytical abilities necessary for innovation and competitiveness across many industries (Marginson et al., 2013). STEM education cultivates creativity and logical reasoning, equipping learners to address real-world difficulties and contribute to scientific advancements, technological innovations, and economic growth (Ejiwale, 2013). Chisom et al. (2024) explained that the significance of Nigerian STEM (Science, Technology, Engineering, and Mathematics) education within the global framework is a complex matter, involving economic advancement, human skill enhancement, and the incorporation of

international educational trends. This section examines the importance of Nigerian STEM education from a global viewpoint, emphasizing its effects, obstacles, and possibilities. Montgomery and Fernández-Cárdenas (2018) examined the global importance of STEM education, associating it with national economic advancement and the development of human competencies. They assert that the advancement of STEM, especially in Science and Technology, has been linked to the expansion of country economies and their GDP. This global trend is evident in Nigeria, where STEM education is widely seen as essential to the nation's economic future. Nonetheless, they acknowledge critical viewpoints on this economic assertion, indicating that the overall quality of education and innovative curricula and pedagogies may exert a more significant impact on economic outcomes.

In developing countries such as Nigeria, STEM education is essential for reconciling resource limitations with industrial advancement. It improves the nation's capacity to cultivate talented individuals in sectors such as engineering, information technology, healthcare, and renewable energy, hence diminishing reliance on foreign knowledge (Ogunleye, 2019). Furthermore, STEM education equips youth with digital literacy, coding, and engineering competencies, hence enhancing their employability in a swiftly changing labour market (Aina, 2013). Challenges including insufficient financing, substandard facilities, and obsolete curricula impede the effective execution of STEM education in Nigeria (English, 2016).

In addition to personal job opportunities, STEM education is crucial for national security, environmental sustainability, and public health. Advancements in medical research, climate change solutions, and infrastructure development depend on a robust STEM foundation (Olutayo & Adebayo, 2021). Countries that invest in STEM education, including Finland, Germany, and South Korea, have experienced significant economic advancement, illustrating the direct correlation between STEM proficiency and national development (Marginson et al., 2013).

To fully leverage the advantages of STEM education, governments and educational institutions must guarantee access to high-quality STEM programs, contemporary learning facilities, and proficient educators. Ultimately, enhancing STEM education will facilitate technological self-sufficiency, economic resilience, and a globally competitive workforce (Samuel & Salisu, 2025).

### **Current State of STEM Education in Nigeria**

The current state of STEM (Science, Technology, Engineering, and Mathematics) education in Nigeria is insufficient to satisfy the requirements of technical progress and economic development. Despite the growing global focus on STEM fields as catalysts for innovation and industrial advancement, Nigeria continues to encounter significant obstacles in the effective implementation of STEM education (Ogunleye, 2019). Numerous schools, especially in rural and disadvantaged regions, are deficient in essential infrastructure, including adequately equipped science laboratories, dependable energy, and internet connection, hence hindering practical learning opportunities (Olutayo & Adebayo, 2021). The deficiency of experienced STEM educators intensifies the problem, as numerous instructors lack the requisite training and resources to proficiently implement STEM courses (Samuel & Salisu, 2025). Furthermore, the STEM curriculum in Nigeria is antiquated and fails to correspond with global trends or industrial requirements.

Numerous educational institutions continue to depend on conventional rote memorizing techniques rather than engaging, inquiry-driven learning methods that promote critical thinking and problem-solving abilities (Abuh & Audu, 2024). Inadequate governmental investment in STEM education restricts chances for teacher training, curriculum enhancements, and the use of contemporary instructional technology, like robotics, artificial intelligence, and digital simulations (Samuel & Salisu, 2025).

Socioeconomic variables, such as poverty, gender inequality, and regional inequalities, impede students' engagement in STEM education. In numerous areas, girls are significantly underrepresented in STEM disciplines owing to cultural biases and restricted access to educational resources (Adeosun, 2024). Moreover, the exorbitant nature of STEM-related resources, such as textbooks, laboratory apparatus, and computer software, hinders students from low-income families from fully participating in STEM disciplines (Aina, 2013).

Notwithstanding these obstacles, initiatives have been undertaken to rejuvenate STEM education in Nigeria. Certain governmental and corporate sector initiatives seek to improve STEM education through specialized programs, Teacher training seminars, and partnerships with technology firms (Abuh & Audu, 2024). Nonetheless, these initiatives are disjointed and unable to effectuate a comprehensive revolution in STEM education across the nation. Nigeria risks lagging in the global technological race without a coherent and well funded strategy. To overcome these issues, Nigeria must implement policy reforms, enhance investment, and use new teaching approaches to cultivate a competitive workforce and attain sustained economic development (Marginson et al., 2013).

### **Challenges of STEM Education in Nigeria**

STEM education in Nigeria has various obstacles that impede its efficacy and influence on national development. Notwithstanding its acknowledged significance in promoting technical progress and economic development, various structural, institutional, and socioeconomic obstacles persistently hinder its execution and accessibility (Ogunleye, 2019). Confronting these issues is essential for Nigeria to fully harness the promise of STEM education in fostering innovation and industrial advancement.

A significant issue with STEM education is insufficient infrastructure and resources. Numerous educational institutions, particularly in rural and disadvantaged regions, are deficient in fundamental laboratory facilities, contemporary scientific apparatus, and digital resources essential for efficient STEM education (Olutayo & Adebayo, 2021). The poor state of educational infrastructure and facilities in Nigeria constitutes a significant challenge, as most schools lack adequate structures conducive to academic pursuits, resulting in an environment that is often unfriendly for learning, thereby diminishing students' interest in their studies. This is prevalent, particularly in rural regions and the northern part of Nigeria. In certain instances, students lack access to contemporary libraries, laboratories, technical workshops, and ICT equipment, which are essential for education. Marginalized pupils are deprived of essential resources, resulting in schools within these communities experiencing a deficiency in quality education. (Kehdinga, 2019). This lack hinders students from participating in hands-on, practical learning experiences, which are crucial for cultivating

problem-solving and technical abilities. Moreover, the availability of electricity, internet connection, and contemporary classrooms continues to be a critical challenge, intensifying inequalities in STEM education across various locations (Adeosun, 2024).

The issue of obsolete curriculum that fails to correspond with modern technological progress. The STEM curriculum in several Nigerian schools is predominantly theoretical and lacks practical applicability (Abuh & Audu, 2024). The evolving industries, driven by advancements in artificial intelligence, robots, and biotechnology, reveal that the existing education system inadequately prepares students with the requisite skills for a competitive global workforce. The lack of curriculum revisions that include expanding STEM subjects hinders students' readiness for future professions in technology-driven sectors.

Moreover, there exists a deficiency of trained STEM educators. A multitude of science and mathematics educators lack specialized training and professional development opportunities necessary for providing high-quality STEM instruction (Aina, 2013). In certain instances, educators depend on antiquated pedagogical techniques that prioritize rote memory over experiential learning and analytical reasoning. The absence of incentives, inadequate remuneration, and substandard working circumstances deter talented professionals from entering STEM education, resulting in a continual deficit of skilled educators (Samuel & Salisu, 2025).

Socioeconomic obstacles further intensify the difficulties confronting STEM education in Nigeria. Poverty, gender inequities, and geographical discrepancies restrict students' access to high-quality STEM education. Numerous students from economically disadvantaged backgrounds face challenges in acquiring educational resources, while cultural and societal conventions frequently dissuade girls from engaging in STEM professions (Ejiwale, 2013). The inadequate remuneration and absence of incentives for educators constitute a significant challenge; teachers receive insufficient compensation and rewards to motivate them. For instance, if students excel under a specific teacher's guidance, that teacher should be recognized. Furthermore, professional development workshops and seminars should be conducted to keep educators informed about advancements in the education sector. The inadequacy and neglect of educators have hindered the retention of competent and quality teachers, as they are disinclined to remain due to a lack of job satisfaction; consequently, promising teachers are seeking opportunities in other fields outside of education where they can earn higher compensation and receive the recognition and incentives they merit. The remuneration of teachers is crucial as a factor influencing student accomplishment, as it has the potential to enhance teacher quality. A teacher receiving an adequate wage that meets basic living expenses may live comfortably, hence enhancing effectiveness through increased motivation to utilize their abilities, competences, and skills. Inadequate compensation undermines teachers' morale, diverts their focus, and impedes their dedication and efficacy. (Kehdinga, 2019)

In northern Nigeria, gender gaps in education are pronounced, with a lower enrolment of girls in STEM disciplines compared to boys (Akinsowon & Osisanwo, 2021). These gaps result in a constrained and inequitable STEM workforce, diminishing Nigeria's capacity to optimize its human resource for technological progress.

Inadequate government funding and policy inconsistencies impede the advancement of STEM education. Despite efforts to advance STEM projects, funding remains insufficient to facilitate extensive improvements (Samuel & Salisu, 2025). Numerous STEM

programs depend on international benefactors and commercial entities for financial support, rendering them unsustainable over time.

Moreover, recurrent alterations in governmental regulations hinder the consistency of STEM education programs, obstructing long-term strategic planning and execution (Olutayo & Adebayo, 2021).

Ultimately, the disparity between industrial requirements and educational outcomes is a significant challenge. The Nigerian education system has faced challenges in aligning theoretical knowledge with industry demands (Ogunleye, 2019). A significant number of graduates lack the technical proficiency and analytical skills demanded by companies in STEM fields. In the absence of robust cooperation among schools, colleges, and industries, students are inadequately prepared for workforce integration, resulting in elevated unemployment rates among STEM graduates.

### **Potential solutions and initiatives for the revitalization of STEM**

Revitalizing STEM education in Nigeria necessitates a thorough and systematic methodology that tackles current issues and fosters a conducive environment for high-quality STEM learning. Through the execution of focused initiatives in infrastructure, curriculum reform, educator training, financial investment, and industry partnerships, Nigeria may fully leverage STEM education to propel technical advancement and economic development (Ogunleye, 2019). The subsequent solutions and interventions are pivotal for the regeneration of STEM education in the nation. Enhancing infrastructure and resource accessibility is a critical step. Numerous schools in Nigeria are deficient in fundamental laboratory equipment, digital tools, and consistent energy, all of which are crucial for efficient STEM education (Akinsowon & Osisanwo, 2014). The government should enhance spending in updating classrooms, equipping laboratories with contemporary scientific instruments, and expanding internet connectivity in schools, especially in rural regions. Public-private partnerships are essential for securing money and technical resources, hence equipping students with the requisite tools to cultivate practical STEM skills (Samuel & Salisu, 2025).

A vital intervention is the revision and modernization of the curriculum. The existing STEM curriculum in Nigeria is antiquated and misaligned with the competencies required by the contemporary technology-driven economy (Ejiwale, 2013). Revisions must include emerging disciplines such as artificial intelligence, robots, biotechnology, and renewable energy, thereby enhancing the relevance of STEM education to the global workforce. Furthermore, incorporating experiential learning, project-oriented evaluations, and real-world problem-solving tasks might improve students' capacity to apply theoretical information in practical contexts (Abuh & Audu, 2024).

Enhancing teacher training and professional development is crucial for the rejuvenation of STEM education. A multitude of STEM educators in Nigeria are deficient in sufficient training and exposure to contemporary pedagogical techniques, hence constraining their capacity to successfully engage students (Aina, 2013). The government and educational institutions must invest in ongoing professional development programs, equipping instructors with training in digital pedagogies, STEM methodologies, and pertinent industry skills. Implementing teacher exchange programs with nations that possess exemplary STEM education frameworks, such as Finland and Singapore, can enhance teaching quality (Abuh & Audu, 2024).

Augmenting government financing and ensuring policy consistency are essential for the sustainability of STEM education



initiatives. Historically, STEM education in Nigeria has been impeded by inconsistent policies and insufficient financial resources (Badmus & Omosewo, 2020). A comprehensive legislative framework that emphasizes funding for STEM education and guarantees its incorporation into national development strategies is crucial. Creating specialized STEM education funding can support projects like laboratory development, educator training programs, and student grants. Furthermore, policymakers ought to collaborate with educators and industry stakeholders to formulate regulations that align with the dynamic requirements of STEM education (Olayemi & DeBoer, 2021).

Improving corporate engagement and internship opportunities can effectively connect STEM education with job requirements. Presently, numerous STEM graduates in Nigeria have challenges in employment due to the disparity between academic knowledge and industrial demands (Ogunleye, 2019). Enhancing collaborations among universities, technical institutions, and industries can furnish students with practical experience via internships, apprenticeships, and mentorship initiatives. Organizations in the technology, manufacturing, and engineering sectors must engage in the development of STEM curricula to guarantee that graduates acquire job-ready competencies (Oladele et al., 2022).

Advancing inclusion and diversity in STEM education constitutes a significant intervention. Socioeconomic obstacles, gender inequities, and regional disparities persist in restricting access to quality STEM education in Nigeria (Ejiwale, 2013). Targeted initiatives, such as scholarships for disadvantaged students, STEM empowerment programs for girls, and the creation of STEM-focused schools in remote regions, can effectively address these disparities. Furthermore, community involvement and awareness initiatives can motivate parents and kids to acknowledge the significance of STEM education and professions (Badmus & Omosewo, 2020).

Educational institutions ought to utilize technology-based learning platforms to enhance the interactivity, adaptability, and accessibility of STEM education for a broader spectrum of pupils. Investing in locally produced educational technology solutions can guarantee cultural relevance and cost-effectiveness (Agunowei & Mayombe, 2025).

### **Case Studies of Exemplary STEM Models**

Numerous nations have effectively adopted STEM education frameworks that have resulted in considerable scientific progress and economic development. These case studies offer significant insights that Nigeria might implement to rejuvenate its STEM education system.

Finland is a prominent example, routinely ranking among the leading nations in global education rankings. The success of Finland in STEM education is mostly due to its student-centered methodology, focus on critical thinking, and incorporation of real-world applications within the curriculum (Kaleva et al., 2019). Finnish educational institutions promote inquiry-based learning, wherein students engage actively in experiments, collaborative endeavors, and problem-solving activities. Furthermore, Finland allocates substantial resources to teacher preparation, guaranteeing that educators are proficient in delivering STEM topics successfully (Kaleva et al., 2019)..



South Korea exemplifies a successful transformation from a developing economy to a worldwide technological powerhouse, attributed to its robust focus on STEM education (Kim, 2024). The South Korean government emphasizes STEM education via national programs that advocate for science and technology instruction from a young age. An essential component of this paradigm is the incorporation of technology in educational settings, encompassing coding, robotics, and artificial intelligence (AI), which equips students for the requirements of the contemporary labor market. Moreover, South Korea's education system promotes robust collaboration among universities, research institutions, and enterprises, guaranteeing that STEM graduates acquire skills that correspond with industry requirements.

Likewise, Singapore has established itself as a leader in STEM education through a meticulously organized and progressive strategy (Honey et al., 2014). The nation has instituted the "Applied Learning Programme" (ALP), promoting experiential, project-oriented education in STEM disciplines. The Ministry of Education in Singapore collaborates with companies to develop curricula that align with the changing demands of the employment market. The government also offers scholarships and grants to assist students in STEM disciplines, ensuring that financial limitations do not impede participation.

In the United States, numerous programs have been implemented to improve STEM education, especially through collaborations between educational institutions and the private sector. Initiatives like "STEM for All" and the integration of inquiry-based learning, project-based learning, and problem-based learning were adopted in some selected articles. Inquiry-based learning was considered to enable and to promote connections within and across curriculum disciplines and improve students' engagement in STEM education (Attard et al., 2021). The U.S. prioritizes diversity and inclusion through targeted initiatives aimed at promoting careers in STEM for underrepresented groups, including women and minorities.

For Nigeria, these effective models underscore the significance of policy-oriented reforms, investment in educator training, partnership with industry, and the incorporation of contemporary technology in education. Implementing analogous strategies—such as advocating experiential learning, revising curricula to correspond with technology advancements, and cultivating public-private collaborations—can assist Nigeria in establishing a more resilient STEM education framework. By examining these international precedents, Nigeria may establish a sustainable STEM education framework that fosters creativity, improves technological proficiency, and promotes enduring economic development (Ogunleye, 2019).

### **Possible Effects on Technological Progress and Economic Development**

An advanced STEM education system may propel technical progress and stimulate economic development in Nigeria. Countries prioritizing STEM education have seen swift industrialization, innovation, and enhanced global competitiveness (Marginson et al., 2013). By enhancing its STEM framework, Nigeria may establish itself as a center for technological advancement, ensuring enduring economic sustainability and diminishing dependence on resource-based sectors.

A primary effect of STEM education is its capacity to stimulate creativity and technical advancement. STEM fields establish the groundwork for advancements in artificial intelligence (AI), robots, biotechnology, renewable energy, and digital transformation (Ejiwale, 2013). Through appropriate expenditures in education and research, Nigeria may cultivate indigenous answers to urgent

issues in agriculture, healthcare, energy, and infrastructure. Countries such as South Korea and Singapore have utilized STEM education to develop strong technology-oriented economies, resulting in progress in semiconductor manufacturing, automation, and smart cities (Kim, 2024). Nigeria has the ability to emulate a similar path by developing a proficient workforce endowed with problem-solving and critical thinking skills.

Moreover, STEM education directly fosters job growth and economic diversity. As the globe shifts to a knowledge-driven economy, the demand for STEM workers is steadily increasing. Nigeria can mitigate unemployment rates by providing its youth with globally sought-after skills, like software development, engineering, data science, and cybersecurity (Nwune et al., 2024). A robust STEM workforce can draw foreign direct investment (FDI), foster local entrepreneurship, and augment the nation's competitiveness in the global technology market.

A significant effect of STEM education is its contribution to the advancement of industrialization and manufacturing. Industrialized countries have employed STEM to enhance automation, improve production efficiency, and cultivate high-value businesses (Ogunleye, 2019). Nigeria's industrial industry has faced challenges due to antiquated technologies and a deficiency of trained workers; nevertheless, an intensified emphasis on STEM education can furnish the requisite skills to modernize production processes and cultivate indigenous industries.

Furthermore, STEM education is essential for addressing national issues and enhancing the quality of life. Nigeria can tackle pressing challenges including climate change, energy sustainability, and public health concerns through a robust STEM foundation ((Kayan-Fadlelmula et al., 2022). Advancements in renewable energy technology can diminish Nigeria's reliance on fossil fuels, while biomedical research can enhance healthcare services and address widespread ailments in the region.

The degree to which STEM can facilitate technological and economic revolution is contingent upon effective execution and strategic investments. Policymakers must guarantee that STEM curricula are revised to align with industry trends, allocate sufficient financing for research and innovation, and cultivate collaborations between educational institutions and industries (Nwune et al., 2024). Furthermore, overcoming obstacles such as gender inequities, socioeconomic disparities, and geographical variations in access to STEM education will be essential for optimizing its effectiveness.

## Conclusion

The revitalization of STEM education is crucial for Nigeria's economic transformation and technological advancement. Despite its recognized importance, the current STEM education framework faces numerous challenges, including inadequate infrastructure, insufficient funding, and a lack of qualified educators. Addressing these issues requires targeted interventions, such as curriculum modernization, investment in teacher development, and enhanced industry-academic collaboration. Lessons from successful STEM education models in countries like Finland and South Korea demonstrate the potential for significant progress when strategic policies

are implemented. By prioritizing STEM education, Nigeria can foster a skilled workforce, drive innovation, and secure long-term economic growth.

### Suggestions

1. The government should update STEM curricula to incorporate emerging technologies and align with industry demands.
2. Schools should be equipped with modern laboratories, reliable internet access, and digital learning tools to enhance STEM education.
3. Professional development programs should be expanded to ensure educators are well-equipped with the necessary STEM teaching methodologies.
4. Collaborations between educational institutions and industries should be encouraged to provide practical learning experiences and internship opportunities.

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